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ABSTRACT

Two studies investigated the differential effects of organizational cuing and strategy training on learning disabled (LD) adolescents, a group which, it has been suggested, is particularly insensitive to the effects of organizational cues. Participants for the first study included 37 LD and 50 nonhandicapped high school students who were randomly assigned to treatment conditions such that half of each group read a passage with a comparison-contrast top-level structure and half read a passage with a description top-level structure. Data were collected one week later via a pretest, posttest, and delayed recall task. Subjects in the second study consisted of 73 LD high school students who were randomly assigned to one of two treatment groups. One group received instruction in a reading strategy emphasizing the recognition and use of authors' organizational structure while encoding and retrieving instructional prose; the second group received placebo instruction on generic problem solving. A posttest and a delayed posttest generated comparison data. Results of the first study indicated that, as anticipated, LD students were not as sensitive as their nonhandicapped peers to the organization of instructional prose. The results of the second study indicated that training in a text structure did significantly improve both the students' recognition of these structures and their recall of instructional content, and that this effect remained relatively stable over at least a week. Implications for designers of instructional print material are discussed, and plans for future research in this area are described. A list of references and eight data tables are provided. (JB)

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THE EFFECTS OF ORGANIZATIONAL CUES ON LEARNERS' PROCESSING OF INSTRUCTIONAL PROSE

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Researchers and developers have given considerable attention recently to the design and development of instructional text (Jonassen, 1983, 1985; Waller & Duffy, 1985). Guidelines arising from this emphasis recommend techniques with which authors of instructional messages, whether they be mediated in printed text, CRT display, or other electronic media, may employ in order to design effective, unambiguous text. A very common recommendation is that designers of instructional text make the structure or organization of an instructional passage as explicit as possible through the use of outlines, headings, summaries, titles, marginal notes, and transitions that cue top-level structure (e.g., Hartley & Burnhill, 1980; Irwin & Davis, 1980). Provision of such cues in text is hypothesized to promote top-down processing, i.e., the formation or activation of relevant schemata in order to ease the decoding burden of reading.

Although the use of such cuing techniques has proved to enhance retention and comprehension in many cases, this effect has not been unilateral (Brooks, 1981; Christensen & Stordahl, 1955; Hartley, Kenely, Owen, & Trueman, 1980; Klare, Shuford, & Nichols, 1958). These equivocal effects may be the result of learners' differential susceptibility to organizational cues in text. Some learners may simply be unaware of the role of these cues in the instructional message and/or how to utilize these

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cues in order to enhance comprehension and aid recall. If this is the case, instructional designers may faithfully incorporate explicit organizational cues in their materials, and still find that substantial portions of their target audience do not benefit from such textual aids. The studies reported in this presentation investigated the differential effects of organizational cuing and strategy training on a group which has been suggested as particularly insensitive to the effects of organizational cues: learning disabled adolescents (Stanovich, 1983; Woodward & Peters, 1983).

One explanation offered for LD students' learning problems is that they possess the innate capacity to succeed on such tasks, but lack knowledge about and/or the ability to use strategies which promote efficient learning. Torgesen (1977, 1979) investigated this hypothesis in his seminal study of LD students' ability to memorize. He found that LD students performed as well as their nonLD counterparts in a memorization task when first taught a strategy for learning stimulus word lists. Torgesen (1980) argued convincingly that LD student had the ability to learn, they simply did not know how to approach the learning task.

The concept of strategy training has been widely recommended as a means of designing effective instruction for secondary LD students (Alley & Deshler, 1979); Smith, 1983; Woodward & Peters, 1983). Alley, Deshler, and their colleagues have made significant contributions in strategy deficit remediation: They have outlined a series of steps for teaching learning strategies to LD adolescents (Deshler, Alley, Warner, & Schumaker, 1981) and

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have completed numerous studies demonstrating the efficacy of this approach. A modification of this approach was employed in Study 2.

This presentation will describe the findings of two studies that investigated the following questions related to this specific audience's response to organizational cues in texts:

Study 1

-- Does organizational structure have differential effects on LD and nonhandicapped learners? Do these effects vary according to the type of organizational structure?

Study 2

-- Can a reading strategy employing recognition and utilization of organizational structure be taught to LD students? How does this training influence their recall and retention of instructional prose?

Study 1

Participants and Methodology

The participants for this study were 37 LD and 50 nonhandicapped students from a suburban high school (grades 10 thrcugh 12) in central Oklahoma. Students from each group were randomly assigned to treatment conditions such that half of each group read a passage with a comparison-contrast top-level structure and half read a passage with a description top-level structure.

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The instructional passages (7-8th grade reading grade level, Dale-Chall readability formula) used in this study were content area reading passages from high school social studies texts. Passages with two different top-level structures were used in order to ascertain if LD and nonhandicapped students were differentially sensitive to a very cohesive structure (comparison/contrast structure) and a less cohesive structure (description structure).

Data were collected in three sessions. First, students were supervised by their teachers while answering the ten pretest comprehension questions designed to determine prior knowledge of content. One week later, they read their assigned passage, completed the immediate recall task, and then responded to the set of 15 posttest comprehension questions. One week after the above procedure, the teachers administered the delayed recall task.

Comprehension items were scored as right or wrong. Recall protocols were scored in two ways. First, they were scored for idea units recalled using a procedure suggested by Meyer's (1975) discourse analysis technique. Interrater reliability of the scoring was found to be .97. Participants' sensitivity to organizational structure and author's cuing of such structure was assessed by their use of the author's organizational structure when producing their written recall protocols. A rating scale adapted from Swanson (1980) was used to assess use of text structure in recall. An interrater reliability of .83 was obtained using this instrument.

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Results

Two 2 (passage: comparison/contrast, description) X 2 (group: LD and nonLD) analyses of covariance with prior knowledge as a covariate revealed the LD students were indeed less sensitive to the author's top-level structure, regardless of the passage type, both at the immediate stage ($F_{1,81} = 4.19$, $p < .044$) and at the delayed recall stage ($F_{1,81} = 5.85$, $p < .018$). This lack of sensitively to structure influenced participants' level of recall. Two one-way ANCOVAs examined three levels of text structure use (high, medium, and low) on immediate and delayed recall. Text structure use had a significant effect on immediate recall (F , $= 6.84$, $p < .002$) and delayed recall (F , $= 11.51$, $p < .0001$). Tables 1 - 6 show the means of these treatment groups by the types of learners.

Insert Tables 1 - 6 about here.

Study 2

Participants and Methodology

Participants were 73 learning disabled adolescents (grades 10 through 12) in two high schools in Oklahoma. The schools were randomly assigned to one of the two treatment groups. An examination of reading test scores from the two groups indicated that groups were equitable in general reading ability. One group received instruction in a reading strategy emphasizing the

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recognition and use of authors' organizational structure while encoding and retrieving instructional prose. The second group received a placebo instruction on generic problem solving (not related to prose processing), **The Productive Thinking Program** (Covington, M.V., Crutchfield, R.F., Davies, L., & Olton, R.M., 1974).

During the week prior to instruction, each group was pretested in order to assess their recognition of common organizational structures, their recall of instructional prose, and their ability to organize their recalls using the author's organizational structure. The following week, each group received approximately four hours of instruction. The experimental group completed print- and teacher-mediated instruction, including instruction on recognizing five organizational structures commonly used in content texts (time-order, problem-solution, cause-effect, comparison-contrast, description) and using these structures as aids during encoding and retrieval. This instruction was typified by extensive practice with examples and nonexamples, teacher and peer modeling of strategies, and analogical illustrations to describe mental processes. The instructional strategy for this training followed these phases:

a) students were asked to read and recall a lengthy passage with an explicitly cued text structure;

b) they were asked to describe the manner in which they went about reading and remembering the material and the inefficiency/inadequacy of this approach was discussed;

c) a new strategy using text structure as an encoding and

retrieval cue was presented as a more efficient/effective approach to this type of reading;

d) students were taught to recognize five typical expository structures;

e) they practiced this identification with increasingly complex prose;

f) the text processing strategy was presented, modeled by the instructor in a think-aloud manner, and then practiced in peer dyads with increasingly complex material; and

g) students practiced identifying instances when the strategy could be appropriately applied.

The control group completed workbook exercises on general problem solving strategies such as locating and describing the problem, considering alternative solutions, etc. At the conclusion of the week, students completed a posttest that assessed their recognition of common organizational structures, their use of structure in organizing recall of an instructional passage, and their recall of the passage content. One week after the final instructional session, all students responded to a delayed posttest which was an alternate form of the posttest.

Results

Four separate 2 (reading level: low, reading level = 4.0 - 7.0; high, reading level = 7.1 - 10.0) X 2 (treatment: experimental, control) analyses of variance were conducted in order to examine the main effects and interactions of the treatments and reading levels on four dependent variables (immediate recognition of structure type, immediate recall

performance, delayed recognition of structure type, and delayed recall performance). An alpha level of .05 was set prior to conducting the analyses.

The ANOVAs revealed several main effects, including main effects for treatment on immediate recognition of structure type ($F_{1,50} = 141.954$, $p < .001$), on immediate recall performance ($F_{1,50} = 26.039$, $p < .001$), on delayed recognition of structure type ($F_{1,50} = 99.562$, $p < .001$), and on delayed recall performance ($F_{1,50} = 20.787$, $p < .001$). No interactions were found between treatments and reading groups. Tables 7 - 8 show the means in the analyses.

Insert Tables 7 - 8 about here

Learners' written recall protocols showed evidence that students in the experimental group used the text structure strategies they had been taught: several drew pictures of the structures, other underlined key words, and many organized their recalls according the text top-level structure.

Conclusions

The results of Study 1 indicate that, as anticipated, LD students are not as sensitive as their nonhandicapped counterparts to the organization of instructional prose. This insensitivity appears even when prior knowledge is statistically

partialed out. In addition, results suggest that this lack of sensitivity contributes to LD students' poorer recall and retention of instructional prose.

The results of Study 2 indicate that training in a text structure use strategy did significantly improve both students' recognition of these structures and their recall of instructional content, and this effect remained relatively stable over at least a week. In other words, the results strongly suggest that students who typically experience severe difficulty in reading comprehension can be taught to use a text structure strategy, and this instruction can improve their recall of information within social studies passages. An examination of the students' recall protocols indicated that students in the experimental group actually used the strategy during the reading and recall tasks. In addition, in the weeks following the study, the LD students' teachers reported that the students continued to make reference to and use their newly acquired reading strategy. Evidently the strategy training had considerable impact upon students' encoding and retrieval behaviors.

The conclusions of these studies have several implications for designers and developers of instructional print materials. First, they provide evaluative data on a particular instructional strategy for teaching toward cognitive strategy outcomes. Second, they point out that including explicit cues to organizational structure in instructional prose may benefit only a portion of the target audience, excluding those portions of the audience that are poor readers. Third, they suggest some additional instruction ("self-conscious text," Pace, 1985) that

may be included alongside content instruction that will aid learners who have immature text processing strategies.

Future investigations are planned to examine other implications of text structure cuing and strategy use. First, strategy training will be extended to include instruction using longer passages that are typical of the passages that LD students must contend with in content area classes. Second, content area instruction will be designed to teach this text processing strategy alongside targeted content objectives. The efficiency, effectiveness, and transferabiity of this learning will be examined.

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Table 1

Mean scores on Comprehension Posttest

Passage	Group	
	LD	NonLD
Adversative	8.000	11.269
	(3.406)	(1.710)
	n=21	n=26
Attributive	7.125	10.958
	(2.604)	(1.899)
	n=16	n=24

Note: Maximum score = 15.

Table 2

Mean Number of Idea Units Recalled--Immediate Recall

Passage	Group	
	LD	NonLD
Adversative	21.063	40.615
	(10.871)	(14.577)
	n=21	n=26
Attributive	24.095	41.375
	(11.749)	(18.939)
	n=16	n=24

Note: Total number of idea units = 159.

Table 3

Mean Number of Idea Units Recalled--Delayed Recall

Passage	Group	
	LD	NonLD
Adversative	14.500	30.654
	(11.599)	(12.652)
	n=21	n=26
Attributive	17.571	31.042
	(12.385)	(15.708)
	n=16	n=24

Note: Total number of idea units = 159.

Table 4

Mean Ratings of Structure Use--Immediate Recall

Passage	Group	
	LD	NonLD
Adversative	5.300	6.654
	(2.939)	(2.497)
	n=21	n=26
Attributive	5.437	6.833
	(3.098)	(2.823)
	n=16	n=24

Note: Ratings ranged from 1 (low) to 10 (high).

Table 9

Mean Ratings of Structure Use--Delayed Recall

Passage	Group	
	LD	NonLD
Adversative	4.500	6.654
	(2.893)	(2.497)
	n=21	n=26
Attributive	3.938	4.708
	(3.098)	(2.662)
	n=16	n=24

Note: Ratings ranged from 1 (low) to 10 (high).

Table 6

Mean Number of Idea Units Recalled by LD Students as a Function of Structure Use and Passage Type

Passage	Structure Use Rating		
	Low[a]	Medium[b]	High[c]
Attributive			
Immediate	16.60	17.37	33.25
	(6.39)	(7.78)	(11.44)
	n=5	n=8	n=4
Delayed	12.22	7.00	30.00
	(8.50)	(3.16)	(10.17)
	n=9	n=4	n=4
Adversative			
Immediate	22.71	23.29	27.67
	(16.02)	(6.73)	(11.98)
	n=7	n=7	n=6
Delayed	12.50	19.80	23.80
	(13.01)	(8.70)	(12.40)
	n=10	n=5	n=5

Note: Total number of idea units = 159.
[a]Low ratings ranged from 1 to 3. [b]Medium ratings ranged from 4 to 7. [c]High ratings ranged from 8 to 10.

Table 7

Mean Structure Recognition Scores

on Posttest and Delayed Posttest

	Treatment	
Reading Level	Experimental	Control
Low (4.0 - 7.0)		
Posttest		
M	2.29	.11
SD	.69	.33
n	17	9
Delayed Posttest		
M	2.18	.22
SD	.88	.44
n	17	9
High (7.1 - 10.0)		
Posttest		
M	1.85	0
SD	.90	0
n	13	15
Delayed Posttest		
M	2.77	.33
SD	1.09	.49
n	13	15

Note: Maximum score possible = 3

Table 8

Main Idea Units Recalled on Posttest and Delayed Posttest

	Treatment	
	Experimental	Control
Reading Level		
Low (4.0 - 7.0)		
Posttest		
M	11.59	5.78
SD	6.09	3.63
n	17	9
Delayed Posttest		
M	12.23	5.22
SD	6.76	3.77
n	17	9
High (7.1 - 10.0)		
Posttest		
M	16.0	6.87
SD	5.99	4.63
n	13	15
Delayed Posttest		
M	12.85	6.27
SD	6.04	2.76
n	13	15

Note: Maximum score possible posttest = 150. Maximum score possible delayed posttest = 128.